

CLAIMS

1. A method for adapting to variations in an available bandwidth to a local network (10) in a communications system, said local network (10) having a plurality of connected user equipment (20), said method comprising the step of detecting (S1) a change in bandwidth available for the local network (10) for communicating with the communications system, **characterized by** the further steps of:

5 identifying (S2) user equipment (20) in the local network (10) to be affected by said detected change, based at least partly on quality of service parameters for said identified user equipment,

10 notifying (S3) said identified user equipment of an adaptation of the allocated bandwidth for said identified user equipment, and

15 adapting (S4) the allocated bandwidth of said identified user equipment.

2. A method according to claim 1, **characterized in that** the local network is a vehicular network (10).

20 3. A method according to claim 1 or 2, **characterized in that** the quality of service parameters comprise at least a current bit rate.

25 4. A method according to any of the claims 1 to 3, **characterized in that** said detection step (S1) comprises the further step of detecting a change in available bandwidth for at least one of a plurality of bearers (60), said bearers (60) together providing the available bandwidth of said local network (10).

30 5. A method according to claim 4, **characterized in that** each of said plurality of bearers (60) is an aggregated bearer, whereby similar data

traffic from different ones of said plurality of user equipment (20) are multiplexed into the aggregated bearer (60).

6. A method according to any of claims 4-5, **characterized in that** said step of detecting (S1) said change in available bandwidth for the at least one of the plurality of bearers (60) in turn comprises a step of collecting information about each of said plurality of bearers (60) and a quality of service value for each of said plurality of bearers (60) and comparing current information to previous information in a bearer data base (54).

7. A method according to claim 3, **characterized in that** said identifying step (S2) comprises comparing said current bit rate to another quality of service parameter for said identified user equipment.

8. A method according to any of claims 1 to 7, **characterized by the** further step (S0) of collecting information comprising at least said quality of service parameters for each user equipment (20) and storing said information in a user data base (55), whereby said identifying (S2) step comprises the step of comparing different quality of service parameters for said user equipment (20) in said user data base (55).

9. A method according to claim 8, **characterized in that** the step (S0) of collecting information further comprises collecting information concerning respective utilized bearer (60) for each user equipment (20).

10. A method according to claim 7, **characterized in that** said another quality of service parameter is one of a maximum bit rate and a minimum bit rate.

11. A method according to claim 10, **characterized in that** said step of identifying (S2) comprises the step of calculating the difference between the current bit rate and the minimum bit rate for each user equipment (20) and selecting user equipment (20) with a difference larger than zero for down-switching, thereby maintaining at least a minimum connection for each user equipment (20) as long as possible.

5 12. A method according to claim 8, **characterized by** updating the information in said user data base (55) in response to user equipment (20) connecting to or disconnecting from the local network (10).

10 13. A method according to claim 6, **characterized by** updating the information in said bearer data base (54) in response to changes in the quality of service values and/or new access entering of said local network (10).

15 14. A method according to any of claims 8 or 12, **characterized in that** said collecting step (S0) further comprises collecting information concerning source and destination IP addresses, maximum and minimum bit rate and utilized bearer for each user equipment (20) and respective peer entities, and storing said information in the user data base (55).

20 25 15. A method according to any of claims 8, 12 or 14, **characterized in that** said collecting step (S0) further comprises collecting information concerning source and destination ports, protocols of each user equipment (20) and its peer entities, and storing said information in the user data base (55).

16. A method according to any of claims 8-15, **characterized by** identifying (S2) said user equipment by means of a selection method comprising the steps of:

selecting a first user equipment (20) in the user data base (55),

5 if a down-switch is required, calculating the difference between the current bit rate and the minimum bit rate for said first user equipment (20),

targeting said first user equipment (20) for a down-switch to its minimum bit rate if said difference is larger than zero,

10 selecting next user equipment (20) in the user data base (55) if said difference is equal to zero, thereby indicating that said user equipment (20) is already at its minimum bit rate,

15 if an up-switch is possible, calculating the difference between a current bit rate and the maximum bit rate for said first user equipment (20),

targeting said first user equipment (20) for an up-switch to its maximum bit rate if said difference is larger than zero,

20 selecting next user equipment (20) in the user data base (55) if the difference is equal to zero, thereby indicating that said user equipment (20) is already at its maximum bit rate,

in the case of a down-switch, repeating above steps until the sum of all down-switches is at least equal to the change in available bandwidth,

25 in the case of an up-switch, repeating above steps until the sum of all up-switches is at most equal to the change in the available bandwidth.

17. A method according to claim 16, **characterized by** identifying all user equipment (20) in the user data base (55) utilizing said at least one bearer (60).

18. A method according to claim 16 or claim 17, **characterized by** updating said user data base (55) in response to said up- or down-switches.

5 19. A method according to any of claims 16-18, **characterized by** further identifying user equipment (20) based on a respective contract.

10 20. A method according to claim 18 or 19, **characterized by** a step of terminating one user equipment if all user equipment (20) are already at their minimum bit rate and a down-switch is required.

15 21. A gateway node (50) in a local network (10) in a communications system, said local network (10) having a plurality of user equipment (20) connected to a mobile router (30), said node (50) having means (51) adapted for detecting a change in the available bandwidth
20 **characterized by** said node (50) comprising:

means (52) adapted for identifying user equipment (20) in the local network (10) to be affected by said detected change, based at least partly on quality of service parameters for said identified user equipment ,

means (53) adapted for notifying said identified user equipment of an adaptation of allocated bandwidth of said identified user equipment, and

25 means (56) adapted for adapting the allocated bandwidth of said identified user equipment..

22. A gateway node according to claim 21, **characterized in that** the local network is a vehicular network.

30 23. A gateway node according to claim 21 or 22, **characterized in that** the node is a wireless gateway (50).

24. A gateway node (50) according to any of claims 21-23,
characterized in that said detecting means (51) is adapted for
detecting a change in the available bandwidth of at least one of a
plurality of bearers (60), said bearers together providing the available
bandwidth to and from the local network (10).

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25. A gateway node (50) according to any of claims 21-24,
characterized in that said detecting means (51) comprise a bearer data
base (54), said bearer data base (54) comprising at least information
about each bearer (60) and/or a quality of service value for each bearer
(60).

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26. A gateway node (50) according to any of claims 21-25,
characterized in that said identifying means (52) comprise a user data
base (55), said user data base (55) comprising at least the current bit
rate and a maximum bit rate and/or a minimum bit rate for said user
equipment.

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27. A gateway node (50) according to claim 26, **characterized by** said
user data base (55) comprising quality of service parameters, internet
protocol information and utilized bearer for each user equipment (20).

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28. A local vehicular network (10) in a communication system, said
local network (10) comprising a plurality of user equipment (20)
connected to a mobile router (30), said local network further comprising
means (51) adapted for detecting a change in available bandwidth,
characterized by:

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means (52) adapted for identifying user equipment (20) in the local
network (10) to be affected by said detected change, based at least
partly on quality of service parameters, for said user equipment,
means (53) adapted for notifying said identified user equipment of

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an adaptation of the allocated bandwidth for said identified user equipment, and

means (56) adapted for adapting (S4) the allocated bandwidth of said identified user equipment.

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30. A local network (10) according to claim 29, **characterized in that** said local network is a vehicular network (10).

10 31. A local network (10) according to claim 29 or 30, **characterized in that** said detecting means (51) are adapted for detecting a change in the available bandwidth of at least one of a plurality of bearers (60), said bearers (60) together providing the available bandwidth to and from the local network (10).

15 32. A local network (10) according to any of claims 29-31, **characterized in that** said detecting means (51) comprise a bearer data base (54), said bearer data base (54) comprising at least information about each bearer (60) and/or a quality of service value for each bearer (60).

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33. A local network (10) according to any of claim 28-32, **characterized in that** said identifying means (52) comprise a user data base (55), said user data base (55) comprising at least the current bit rate and a maximum bit rate and/or a minimum bit rate for said user equipment

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34. A local network (10) according to claim 33, **characterized by** said user data base (55) comprising quality of service parameters, internet protocol information and utilized bearer for each user equipment (20).

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